

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A multiple antenna system, comprising:
first and second antennas;
a first signal circuit operatively connected with said first antenna via a first signal path
and a second signal circuit simultaneously operatively connected with said
second antennas via a second signal path;
a first parallel tuning circuit selectively connectable in parallel with the first signal path,
the first parallel tuning circuit selectively adjusting the impedance of the first
antenna.
2. (Original) The multiple antenna system of claim 1 further comprising a third antenna
connected with a third signal source via a third signal path.
3. (Original) The multiple antenna system of claim 1, wherein the first and second signal
circuits are capable of generating electromagnetic signals.
4. (Original) The multiple antenna system of claim 3, wherein the electromagnetic signals
include radio frequency signals.
5. (Original) The multiple antenna system of claim 1, wherein the first and second signal
circuits generate signals at unique frequencies.
6. (Original) The multiple antenna system of claim 1, wherein the first and second signal
circuits generate signals at the same frequencies.

7. (Original) The multiple antenna system of claim 1, wherein the first and second antennas are fabricated on a common dielectric material.
8. (Original) The multiple antenna system of claim 1, further comprising an antenna housing capable of housing at least the first and second antennas.
9. (Original) The multiple antenna system of claim 1, wherein the second signal circuit is capable of generating signals in multiple frequency bands.
10. (Previously Presented) The multiple antenna system of claim 9, wherein the first parallel tuning circuit increases the electromagnetic isolation between the first and second antennas in multiple frequency bands.
11. (Original) The multiple antenna system of claim 1, wherein the first parallel tuning circuit includes an impedance matching circuit.
12. (Previously Presented) The multiple antenna system of claim 11, wherein the impedance matching circuit matches an impedance of the second antenna via electromagnetic coupling with the first antenna.
13. (Previously Presented) The multiple antenna system of claim 11, wherein the impedance matching circuit matches an impedance of the second antenna.
14. (Previously Presented) The multiple antenna system of claim 11, wherein the first parallel tuning circuit includes a plurality of impedance matching circuits, each impedance matching circuit being independently selectively connectable in parallel to the first signal path.

15. (Previously Presented) The multiple antenna system of claim 1 further comprising a second parallel tuning circuit selectively connectable in parallel to the second signal path.
16. (Previously Presented) The multiple antenna system of claim 15, wherein the second parallel tuning circuit increases the electromagnetic isolation between the first and second antennas.
17. (Original) The multiple antenna system of claim 1, wherein the first tuning circuit is selectively connectable to the first signal path near the first antenna.
18. (Original) The multiple antenna system of claim 1, wherein the first tuning circuit creates an impedance at an input of the first antenna substantially equivalent to an open circuit at the transmission frequency of the second antenna.
19. (Original) The multiple antenna system of claim 1, wherein the first parallel tuning circuit includes a plurality of band tuning circuits, each band tuning circuit being independently selectively connectable with the first signal path.
20. (Previously Presented) The multiple antenna system of claim 19, wherein each band tuning circuit creates a different impedance at an input to the first antenna associated with the connection to the first signal circuit.
21. (Previously Presented) The multiple antenna system of claim 19, wherein the first tuning circuit includes a first band tuning circuit having an impedance matched to the second antenna and a second band tuning circuit having an impedance matched to a third antenna.

22. (Previously Presented) The multiple antenna system of claim 19, wherein the first parallel tuning circuit comprises an adjustable impedance based on selectively connecting different ones of the plurality of band tuning circuits with the first signal path.

23. (Previously Presented) The multiple antenna system of claim 19, further comprising a detector to control selective connection of individual ones of the plurality of band tuning circuits with the first signal path.

24. (Original) The multiple antenna system of claim 1, wherein the first signal source includes a radio transceiver.

25. (Original) The multiple antenna system of claim 1, wherein the multiple antenna system is adaptable for use in a cellular telephone.

26. (Currently Amended) A parallel tuning circuit for use in a multiple antenna system comprising a first antenna operatively connected to a first signal circuit and a second antenna simultaneously operatively connected to a second signal circuit, the parallel tuning circuit comprising:

a first impedance matching circuit; and

a first switch selectively connecting in parallel the first impedance matching circuit with a transmission line connecting the first antenna to the first signal circuit to control electromagnetic coupling between the first and second antennas, wherein the first impedance matching circuit is configured to create an impedance at an input of the first antenna substantially equivalent to an open circuit at the transmission frequency of the second antenna.

27. (Previously Presented) A parallel tuning circuit of claim 26, further comprising:

a second impedance matching circuit; and

a second switch selectively connecting in parallel the second impedance matching circuit with a transmission line connecting the second antenna to the second signal circuit.

28. (Previously Presented) The parallel tuning circuit of claim 26, wherein the first impedance matching circuit matches an impedance of the second antenna.

29. (Previously Presented) The parallel tuning circuit of claim 26, wherein the first impedance matching circuit matches an impedance of the second antenna in multiple frequency bands.

30. (Original) The parallel tuning circuit of claim 26, wherein the first impedance matching circuit includes a selectable impedance.

31. (Original) The parallel tuning circuit of claim 30, wherein the selectable impedance is digitally selectable.

32. (Original) The parallel tuning circuit of claim 30, wherein first impedance matching circuit dynamically adjusts impedance based on external interference.

33. (Previously Presented) A method of adjusting impedance in a multiple antenna system, comprising:

detecting whether a first signal source connected with a first antenna via a first signal path is active or inactive;

detecting whether a second signal source connected with a second antenna via a second signal path is active or inactive, wherein the second antenna is disposed proximate to the first antenna to within approximately one wavelength or less; and

selectively connecting a first parallel impedance circuit in parallel with the first signal path if the first signal source is inactive and the second signal source is active to reduce electromagnetic coupling between the second and first antennas.

34. (Previously Presented) The method of claim 33, further comprising:

measuring external interference proximate to the first antenna; and

adjusting the impedance of the first parallel impedance circuit based on the measured external interference.

35. (Previously Presented) The method of claim 33, further comprising:

detecting whether a third signal source connected with a third antenna via a third signal path is active or inactive, wherein the third antenna is proximate to the first antenna to within approximately one wavelength or less; and

selectively connecting a first parallel impedance circuit in parallel with the first signal path if the first signal source is inactive and the third signal source is active to reduce electromagnetic coupling between the third and first antennas.

36. (Previously Presented) The method of claim 33, wherein the first parallel impedance circuit comprises a plurality of selectively connectable parallel impedance circuits, and wherein selectively connecting said first parallel impedance circuit in parallel with the first signal path if the first signal source is inactive and the second signal source is active to reduce electromagnetic coupling between the second and first antennas includes selectively attaching a selected one of the plurality of parallel impedance circuits in parallel with the first signal path.

37. (Previously Presented) The method of claim 33, further including selectively connecting a second parallel impedance circuit with the second signal path if the first signal source is active and the second signal source is inactive to reduce electromagnetic coupling between the first and second antennas.

38. (Previously Presented) The method of claim 33, wherein the first parallel impedance circuit comprises a plurality of parallel impedance circuits, and wherein selectively connecting said first parallel impedance circuit in parallel with the first signal path if the first signal source is inactive and the second signal source is active to reduce electromagnetic coupling between the second and first antennas includes selecting a desired parallel impedance, selecting from the plurality of parallel impedance circuits one or more parallel impedance circuits that most closely match the desired parallel impedance, and attaching the one or more selected parallel impedance circuits in parallel with the first signal path.

39. (Previously Presented) A multiple antenna system comprising:
a first antenna connected to a first signal circuit via a first signal path;
a second antenna disposed proximate the first antenna to within approximately one wavelength or less and connected to a second signal circuit via a second signal path; and
a first parallel tuning circuit selectively connectable in parallel with the first signal path, wherein the first parallel tuning circuit increases the electromagnetic isolation between the first and second antennas.
40. (Previously Presented) The multiple antenna system of claim 39 wherein the second signal circuit generates signals in multiple frequency bands.
41. (Previously Presented) The multiple antenna system of claim 40 wherein the first parallel tuning circuit increases isolation between the first and second antennas in multiple frequency bands.
42. (Previously Presented) The multiple antenna system of claim 39 wherein the first parallel tuning circuit includes an impedance matching circuit.
43. (Previously Presented) The multiple antenna system of claim 42 wherein the impedance matching circuit matches an impedance of the second antenna via electromagnetic coupling with the first antenna.
44. (Previously Presented) The multiple antenna system of claim 42 wherein the first tuning circuit includes a plurality of impedance matching circuits, each impedance matching circuit being independently selectively connectable in parallel to the first signal path.

45. (Previously Presented) The multiple antenna system of claim 39 further comprising a second parallel tuning circuit selectively connectable in parallel to the second signal path.

46. (Previously Presented) The multiple antenna system of claim 45, wherein the second parallel tuning circuit increases the electromagnetic isolation between the first and second antennas.

47. (Previously Presented) The multiple antenna system of claim 39 wherein the first tuning circuit creates an impedance at an input of the first antenna substantially equivalent to an open circuit at the transmission frequency of the second antenna.

48. (Previously Presented) The multiple antenna system of claim 39 wherein the first parallel tuning circuit includes a plurality of band tuning circuits, each band tuning circuit being independently selectively coupled with the first signal path.

49. (Previously Presented) The multiple antenna system of claim 48 wherein each band tuning circuit creates a different impedance at an input to the first antenna associated with the connection to the first signal circuit.

50. (Previously Presented) The multiple antenna system of claim 49, wherein the first tuning circuit includes a first band tuning circuit having an impedance matched to the second antenna and a second band tuning circuit having an impedance matched to a third antenna.

51. (Previously Presented) The multiple antenna system of claim 48 wherein the first parallel tuning circuit comprises an adjustable impedance based on selectively connecting different ones of the plurality of band tuning circuits with the first signal path.

52. (Previously Presented) The multiple antenna system of claim 48 further comprising a detector to control selective connection of individual ones of the plurality of band tuning circuits with the first signal path.

53. (Previously Presented) The multiple antenna system of claim 1 wherein said first antenna is disposed proximate said second antenna to within approximately one wavelength or less.

54. (Previously Presented) The parallel tuning circuit of claim 26 wherein said first antenna is disposed proximate said second antenna to within approximately one wavelength or less.

55. (Previously Presented) The multiple antenna system of claim 39 wherein said first and second antennas are simultaneously operatively connected to respective first and second signal circuits via respective first and second signal paths.

56. (Previously Presented) A method of adjusting impedance in a multiple antenna system comprising:

detecting whether a first signal source operatively connected with a first antenna via a first signal path is active or inactive;

detecting whether a second signal source simultaneously operatively connected with a second antenna via a second signal path is active or inactive; and

selectively connecting a first parallel impedance circuit in parallel with the first signal path if the first signal source is inactive and the second signal source is active to reduce electromagnetic coupling between the second and first antennas.